15. Planeleaf Willow-Wolf Willow-Bog Birch Ecological Series

Table 15-1. Full names and short names for the ecological types in the Planeleaf Willow-Wolf Willow-Bog Birch Ecological Series.

Ecological Type Code	Ecological Type Name	Plant Association Code	Short Name
RI4	Planeleaf willow/water sedge–Deep to very deep alluvial Cryaquolls and Borohemists–U-shaped or flat floodplains, draw bottoms, benches, slumps, and swales, > 9,500 ft	SAPL2/CAAQ	Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms
RI5	Wolf-planeleaf willows/water sedge–Deep alluvial Cryaquolls and Cryohemists–Flat to U-shaped floodplains and terraces, > 9,500 ft	SAWO-SAPL2/CAAQ	Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms
RI6	Shrubby cinquefoil/Idaho fescue–Moderately deep colluvial to alluvial clayey Cryoborolls–Linear to concave to U-shaped footslopes and draw bottoms, 9,000-10,800 ft	PEFL15/FEID	Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales
RI7	Planeleaf willow/marsh-marigold–Cryaquepts–Concave footslopes and lower backslopes, > 11,500 ft	SAPL2/PSLE	Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms

The *Salix planifolia* ssp. *monica-Salix wolfii* Series is described as new here and is based on the *Salix planifolia* series of Hess (1981), Hess and Wasser (1982), Komárková (1986), and Kittel and others (1994), and on the *Salix planifolia* Alliance of Kittel and others (1996). It is also based on the *Salix wolfii* Series of Kittel and others (1994) and the *Salix wolfii* Alliance of Kittel (1996), and includes the *Betula glandulosa* Series and part of the *Pentaphylloides floribunda* Series of Komárková (1986).

Stands are sometimes long and narrow, confined along a stream, or they may be large and isodiametric where water spreads on benches. Stands are easily delineated on aerial photos.

Vegetation

Early seral stages often lack willows or support only sparse willows, and are usually dominated by shrubby cinquefoil, Baltic rush, Kentucky bluegrass, or dandelion (Youngblood and others 1985-1989, Girard and others 1995).

Later seral stages are dominated by the short shrubs planeleaf willow, Wolf willow, or bog birch, in a dense canopy layer with few openings except near streams (Kittel and others 1994). The two willows occur sometimes one at a time, sometimes together, but bog birch rarely occurs without one or both willows. Planeleaf willow occurs on wetter sites (Girard and others 1995), or on colder sites, such as small, cold-air drainage basins.

In the Northern Rockies, Wolf willow often occurs with taller willow species such as Booth willow (SABO2) or taller planeleaf willow (*Salix planifolia* ssp. *planifolia;* Girard and others 1995). In the UGB, Wolf willow is almost exclusively an associate of shorter planeleaf willow (ssp. *monica*), as taller planeleaf willow is not found here.

These short shrubs are covered with snow much of the year. Sites with good willow and sedge cover have high bank stability and can withstand floods without damage (Hansen and others 1988-1989). In good condition, such sites provide great natural watershed protection and keep water in the stream that would not otherwise be there in late season.

Table 15-2. Climate and Water

Characteristic	Value	Reference
Precipitation zone	710 mm/yr (650 to 750 mm/yr) 28 in/yr (25-29 in/yr)	Phillips 1977, Cooper 1990
Soil pH	pH 6.4 (5.6-7.1)	Johnson 1996
Peat depth	159.0 cm (116-165 cm) 62.6 in (46-65 cm)	
Water temperature	12.3°C (7-18°F) 54.1°F (45-64°F)	
Water table depth	+3.0 cm (+0 – +6 cm) +1.2 in (+0 – +2 in)	

Sites dominated by shrubby cinquefoil (*Pentaphylloides floribunda*) occur where the water table has dropped in recent years (to around 1 m below surface in summer), often because of removal of willows and soil compaction by herbivores (Hansen and others 1988). Such sites have less bank stability, lower forage and browse production, and less watershed protection capability, and many have been invaded by riparian weeds (Kentucky bluegrass, dandelion, etc.) and dryland species from adjacent uplands (Idaho fescue, Thurber fescue, etc.).

Replanting planeleaf or Wolf willow from rooted cuttings can restore willow cover to a depleted site to improve wildlife cover and browse, bank stability, and fisheries habitat (Hansen and others 1988-1989). Stands dominated by shrubby cinquefoil (*Pentaphylloides floribunda*) do not respond well to burning or herbicide treatment of the cinquefoil (Youngblood and others 1985).

Disturbance decreases willow cover, and encourages drier-site species such as tufted hairgrass (*Deschampsia cespitosa*) and Kentucky bluegrass (Girard and others 1985). Insects and diseases in this series are not documented.

Fire Management

Burning stands of water sedge (*Carex aquatilis*) can temporarily increase productivity, but burning is usually not possible until late summer or fall when shoots dry (Hansen and others 1989ab). Fires cause dramatic increases in bluejoint reedgrass (*Calamagrostis canadensis*) where it is present (Hansen and others 1988).

Range and Wildlife Management

Livestock forage production is moderate on sites in good condition, to low on sites in poor condition. Short growing seasons and wet soils limit livestock use to summer and fall (see Hansen and others 1989ab). The number of days sites are grazed in the late and hot seasons should be limited (Myers 1989). Deferred and rest-rotation systems favor sedges over willows (Hansen and others 1989ab). Sedges can tolerate heavy grazing, particularly when upland species are cured or when livestock distribution is poor. Heavy grazing by cattle may open the shrub canopy, encouraging invasion by dandelions, exotic clovers, and dryland species. Livestock may use the riparian areas for water, requiring protection of the stream and its banks, or livestock-control barriers.

Heavy grazing by livestock compacts soil, lowers the ground water table, contributes to streambank instability, reduces willow and sedge cover and density, and encourages invasion by shrubby cinquefoil, Kentucky bluegrass, dandelion, and dryland plants. Protracted heavy grazing eliminates willows and sedges, sometimes permanently, which may cause hummocking (Girard and others 1995). Livestock grazing favors Wolf willow over planeleaf willow (Kittel and Lederer 1993, Kittel and others 1994, Girard and others 1995), whereas wetter sites may support more planeleaf willow (Girard and others 1995). Continued yearly grazing may result in soil compaction, erosion, and bank degradation (Padgett and others 1989, Kittel and Lederer 1993, Kittel and others 1994).

Big-game browsing and grazing on these sites is usually light because sites are snow-covered and inaccessible to animals during the winter. Waterfowl sometimes use the sites for nesting and cover, and eat the seeds of water sedge (Hansen and others 1989ab). Moose and deer may use these sites in Utah, Wyoming, and Idaho (Youngblood and others 1985, Padgett and others 1989).

Some sites were formed through the activities of beaver, which may still inhabit them.

Bighorn sheep may use stands in their high-elevation ranges. Such stands are components of bighorn range, which are not assignable to summer or winter ranges in the Buffalo Peaks area, northeast of the UGB. Considerable bighorn summer range is in the alpine zone, above these sites. Willows (*Salix*), sedges (*Carex*), and tufted hairgrass (*Deschampsia cespitosa*) are significant parts of bighorn sheep diet (Shepherd 1975).

Heavily sodded banks overhanging streams provide excellent cover for fish. Willows enhance fish habitat through streambank protection, cover, and thermal protection (Hansen and others 1989ab). Earlier seral stages, which lack willows or sedges or both, are of considerably less value to fish.

Recreation, Roads & Trails, Scenery

Sites are generally not suitable for road and trail construction. Level crossings could be riprapped or stabilized with rock, or the riparian area could be bridged. Fills require culverts, and should have high rock content. Winter use for snowmobiling or skiing has little effect. Site and watershed damage may occur in the early spring and late fall-early winter, when the sites are still wet.

Off-road vehicles (ORV) can cause extensive damage in the summer and worse damage in the early spring and late fall when sites are the wettest. ORV use (except in deep winter) should be discouraged.

Scenic values can be high, especially when sites are in good condition. Wildlife-viewing values can be high (Hansen and others 1989ab). These sites are not resistant to trampling, and moderate to heavy use by people fishing can lead to compaction and riparian deterioration. Rutting can be severe from campers, hikers, pack stock, or fishers (Hansen and others 1989ab).

Key to Ecological Types in the Planeleaf Willow Series

*. Wet graminoids include water sedge (CAAQ), beaked sedge (CAUT), short-beaked sedge (CASI2), soft leaved sedge (CADI6), bluejoint reedgrass (CACA4), and tufted hairgrass (DECE).

†. Moist graminoids include Bebb's sedge (CABE2), elk sedge (CAGE2), blunt sedge (CAOB4), meadow sedge (CAPR7), and Kentucky bluegrass (POPR).

1. Planeleaf willow (SAPL2) or Wolf willow (SAWO) present and >3% cover. Other willows may be present as well. Shrubby cinquefoil (PEFL15) or sagebrush species (ARTRV, ARAR8) may be present. Wet graminoids* sometimes conspicuous and >20% cover. Moist graminoids† sometimes conspicuous as well ..... (2)
1. Planeleaf willow and Wolf willow usually absent, sometimes <1% cover. Dominated by shrubby cinquefoil or one of the sagebrush species, the aggregate cover of cinquefoil and sagebrush usually >10% cover. Wet graminoids* absent; the understory dominated by moist graminoids† RI6

2. Wolf willow usually absent, rarely present, always <5% cover ..... (3)
2. Wolf willow present and conspicuous, always >5% cover..... RI5

3. Soils Cryaquepts or Cryaquents, in very cold landscape positions. Soil temperature regime Cryic, bordering on Pergelic. Wet graminoids* usually absent. Sites often bordering Alpine ecological types or high-Subalpine grasslands. Elevations >11,500 ft..... RI7
3. Soils Cryaquolls or Borohemists, in cold landscape positions. Soil temperature regime Cryic. Wet graminoids* always present, often conspicuous and >5% cover. Elevations 9,500-12,200 ft..... RI4

Table 15-3. Characteristics of Ecological Types within Ecological Series 15 in the Upper Gunnison Basin.
Numbers are shown in form *Average (Minimum-Maximum)*

Code Short Name	No. Samples	Elevation, ft	Avg. Aspect, °M (r) Slope, %	Soil Coarse, %	Depth, cm Mollic, cm	Surface: Coarse, % Bare, %	Cover, %: Trees Shrubs Gramin. Forbs	Total Live Cover, % No. Species TLC/NS, %
RI4 Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms	19	10,353 (9,540-12,040)	57 (0.45) 2 (0-7)	31 (11-46)	58 (31-70) 28 (0-70)	2 (0-15) 7 (0-75)	0 (0-1) 66 (4-186) 93 (23-147) 49 (8-113)	208.5 (121.5-328.8) 27 (12-49) 8.7 (3.5-17.4)
RI5 Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms	14	9,895 (9,510-10,650)	161 (0.28) 2 (1-4)	14 (0-27)	78 (60-100) 53 (22-90)	0 (0-15) 38 (0-100)	0 (0-1) 101 (40-167) 99 (25-158) 58 (7-105)	259.8 (176.5-332.5) 24 (13-35) 11.6 (7.5-25.1)
RI6 Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales	10	9,768 (9,080-10,760)	207 (0.20) 12 (3-47)	42 (32-53)	54 (52-56) 25 (22-28)	5 (0-18) 18 (0-100)	1 (0-6) 36 (2-75) 88 (37-170) 59 (17-110)	184.3 (110.8-311.0) 26 (12-41) 8.6 (3.0-19.8)
RI7 Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms	2	11,963 (11,640-12,285)	207 (0.20) 4 (3-4)	*	33 (20-46) 0 (0-0)	1 (1-1) 5 (5-5)	0 (0-0) 100 (100-100) 8 (1-16) 47 (39-54)	154.8 (139.8-169.8) 28 (26-29) 5.7 (4.8-6.5)

*. Not sampled.

PLANELEAF WILLOW/WATER SEDGE–COLD DEEP ALLUVIAL SOILS–BOTTOMS

Planeleaf willow/water sedge–Deep to very deep alluvial Cryaquolls and Borohemists–
U-shaped or flat floodplains, draw bottoms, benches, slumps, and swales, > 9,500 ft

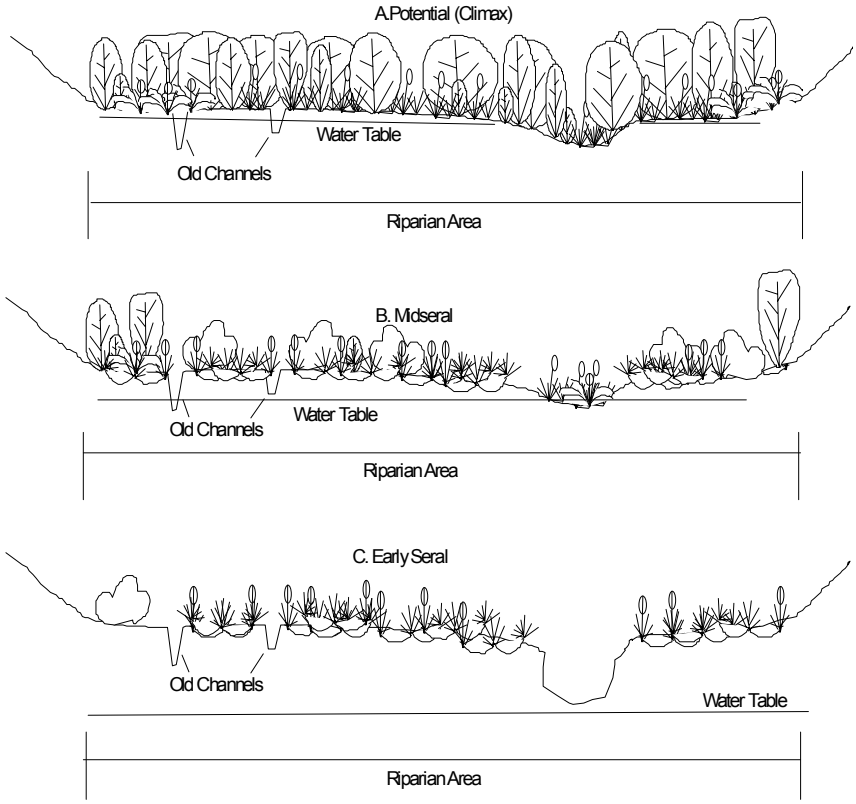


Figure 15-1. Three different cross-sections of vegetation structure of *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*, representing successively earlier seral stages.

Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms is a very common type on Subalpine floodplains and other wet sites. In the Gunnison Basin, it occurs on subalpine streamsides and wet flats. This type is the classic Subalpine short-willow riparian community found throughout the western slopes of the Rocky Mountains. *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms* is a remarkably uniform type, considering that its range stretches from southern Canada to northern New Mexico, and it is very common within that range. It is one of our most identifiable types.

Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms is characterized by planeleaf willow (SAPL2) and water sedge (CAAQ). Marsh-marigold (PSLE) is also common in many sites; see Table 15-7 for common species names and codes. Other distinguishing features include location on alluvial flats and streamsides, short willows (planeleaf willow), bog birch (BEGL), and Cryaquolls or Histosols.

Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms is related to *Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms*, which occurs on somewhat deeper, less-coarse soils, and includes Wolf willow (SAWO) as a codominant with planeleaf willow. *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms* is also related to *Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms*, which occurs at higher elevations on shallower Cryaquepts, and lacks water sedge. *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms* is also related to *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales*, which occurs primarily in deep rainshadows on coarser soils, and lacks willows entirely.

Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales, here treated as a separate "ecological type," could represent an earlier seral stage (Fig. 15-1B) of *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*. Because the shrubby cinquefoil community occurs in rainshadows, it is subject to a dry climate in which evaporation is significant and willow stands are susceptible to reduction in water tables. *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and*

swales sites all occur in parks and swales where considerable, concentrated livestock grazing has occurred in past decades. Heavy grazing probably increased the amount of bare soil and removed soil-binding species such as willows and wet sedges, resulting in an abrupt drop in the water table, which probably eliminated the remaining willows.

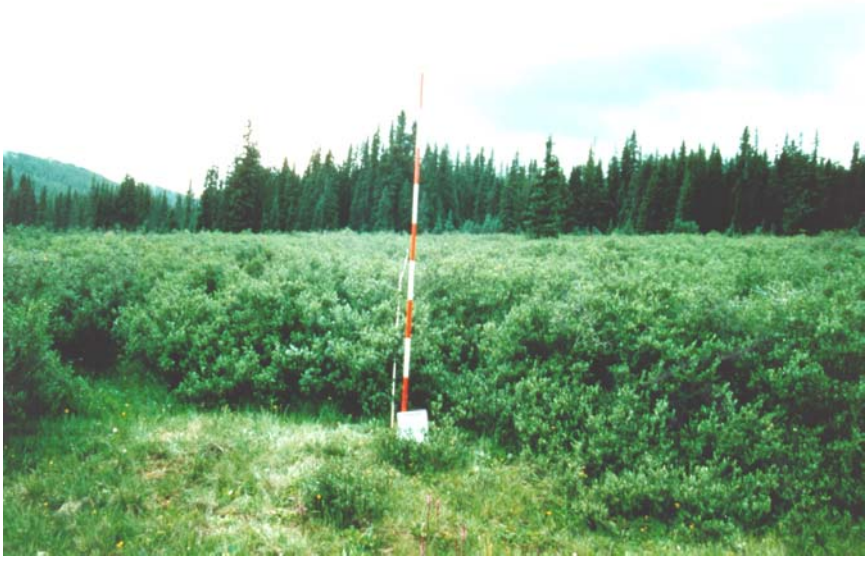
Succession usually involves vegetation, land, water, and soil. In this cold climate, these sites are usually distinguishable as riparian communities even at early seral stages.

In very early seral to early seral stages, there are no shrubs, or dryland shrubs such as mountain big sagebrush (ARTRV) or silver sagebrush (ARCA13) dominate, with an understory of exotic bottomland species such as Kentucky bluegrass, dandelion, Baltic rush, native dryland grasses, and assorted dryland forbs. The water table is usually low in summer and fall. In early midseral to midseral stages, willow cover is patchy (<50% across the site), with a mix of willows and cinquefoil. There is little to no reproduction of planeleaf or Wolf willow. Small patches of water sedge, tufted hairgrass, reedgrass, and moist-site forbs occur in the low bottom microsites, but sagebrush, cinquefoil, bluegrass, dandelion, and dryland forbs occur on higher microsites. The water table is high in spring and remains high enough in summer and fall to keep the small, lowest microsites wet all year.

In late midseral to potential natural community stages, willow cover is >65% across the site, and is continuous except in the wettest patches, which are uniformly dominated by water sedge, reedgrass, and other wet-site plants. Sagebrush, cinquefoil, Kentucky bluegrass, quackgrass, and dandelion are usually absent. The water table is high throughout the year, with standing water in lowest microsites through the growing season.

Spruce riparian forests adjoin these communities on higher-gradient sites upstream and downstream. Cold, moist spruce-fir forests occur on adjacent steep slopes with much better-drained soils. Thurber fescue grasslands border these sites on deeper, loamier, better-drained uplands.

Horizontal obstruction varies from low to high, averaging moderately low; see Table 15-4. Deer and elk use these sites sparingly, and only as summer range. These sites are never used in the winter, even mild ones. Deer and elk use of all community types is moderate during spring through fall, mostly for overnight stays.



A late seral planeleaf willow/water sedge site (Community Type C) near Slumgullion Pass. This type occurs throughout the whole Rocky Mountain chain. The foreground is a recent gravel bar that is naturally revegetating slowly. Within the stand in the middleground, cover by planeleaf willow is almost complete, with several hidden channels that formerly held the creek or part of it. Planeleaf willow 93% cover, bluejoint reedgrass 48%, Rocky Mountain hemlock-parsely 33%, soft leaved sedge 25%, water sedge 24%, Bebb sedge 13%, bog birch 11%, marsh-marigold 9%. Coarse Fragments Cover = 0%, Total Live Cover = 166%, Coarse Fragments in Soil = 17. Soil sampled as a Typic Cryosaprist, Euic. Slumgullion Pass Quadrangle, elevation 11,040 ft, 7% 086° (E) slope. July 20, 1993.

Summary of Ecological Type Characteristics

1. Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

NUMBER OF SAMPLES	19, soil descriptions from 8 of these (total 19)
ELEVATION	10,353 ft (9,540-12,040 ft); 3,155 m (2,908-3,670 m)
AVERAGE ASPECT	57°M (r = 0.45)
LITHOLOGY	A wide variety, with granite [36%], breccia [18%], and shale [18%] leading.
FORMATIONS[1]	A wide variety
LANDFORMS	Predominantly floodplains and draws [62%], with some benches and slumps [19%] and others
SLOPE POSITIONS	Usually in bottoms
SLOPE SHAPES	U-shaped [53%] to flat [32%]
SLOPE ANGLE	2.4% (0-7%)
SOIL PARENT MATERIAL	Mostly alluvium [72%], some colluvium [17%]
COARSE FRAGMENTS	0.7% (0-2%) cover on surface, 31.2% (11-46%) by volume in soil
SOIL DEPTH	58 cm (31-70 cm); 22.9 in (12-28 in)
MOLLIC THICKNESS	28 cm (0-70 cm); 11.0 in (0-28 in)
TEXTURE	Organic [56%] to silty (silty clay loam-silty loam-silty clay [44%])
SOIL CLASSIFICATION	Cryaquolls [60%] or Borohemists [30%]
TOTAL LIVE COVER	208.5% (121.5-328.8%)
NUMBER OF SPECIES	26.5 (12-49)
TOTAL LIVE COVER/NO. SPECIES	8.7% (3.5-17.4%)
CLIMATE	Cold, wet to moderately wet lower Subalpine climate on sites in good condition; in earlier seral stages, microclimate can be cool, moderately dry, as the water table drops and the soil surface is less shaded (Fig. 15-1).
WATER	Climax sites are ponded seasonally or throughout the growing season. At earlier seral stages, the water table is lower (Fig. 15-1). The water table level can be changed by management, usually by manipulating the water-holding and sediment-holding capacities of the vegetation on site and along the water course.

Table 15-4. Wildlife values (relative to the whole UGB) for the principal wildlife species using *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*.

	Mule Deer	Elk
CT	Season–Preference	Season–Preference
All	Winter, Any–Low Spring/Fall– Moderate (Overnight)	Winter, Any–Low Spring/Fall– Moderate (Overnight)

Key to Community Types

1. Planeleaf willow dominant, >50% cover ..... (2)
1. Planeleaf willow <40% cover ..... (4)

2. Water sedge prominent, >15% cover. Total wet sedge cover (CAAQ, CAUT) >45% ..... **A**
2. Water sedge always present, but <15% cover. Total wet sedge cover <45% ..... (3)

3. Bog birch codominant with planeleaf willow, >10% cover ..... **C**
3. Bog birch absent to minor, <5% cover ..... **B**

4. Planeleaf willow always present but <10% cover. Water sedge sometimes >40% cover ..... **E**
4. Planeleaf willow >10% cover. Water sedge absent to abundant, but always <40% cover ..... (5)

5. Bog birch codominant with planeleaf willow, >10% cover ..... **C**
5. Bog birch absent to minor, <5% cover ..... **D**

Descriptions of Community Types

A *Planeleaf willow-taller willows-water sedge* is dominated by planeleaf willow at >55% cover. Taller willows are common associates, such as Geyer willow (SAGE2), blue willow (SADR), or serviceberry willow (SAMO2). Total willow cover is >75%. Water sedge dominates the understory, sometimes with beaked sedge (CAUT); total cover both wet sedges is >65%.

B *Planeleaf willow-marsh-marigold-water sedge* is dominated by planeleaf willow at >50% cover, usually without other willows. Water sedge is always present with <15% cover. Characteristic understory species are other sedges, bluejoint reedgrass (CACA4), or marsh-marigold (PSLE).

C *Planeleaf willow-moist sedges-Baltic rush-moist forbs* is dominated by planeleaf willow with 15-98% cover, codominant with bog birch (BEGL) at >10% cover. Usually no other willows are present. The understory is dominated by a variety of wet-to-moderately-wet-site sedges, such as water sedge, "cliff" sedge (CASC12), western sedge (CAOC2), soft leaved sedge (CADI6), or Bebb's sedge (CABE2). Moist-to-wet-site forbs may also be prominent, such as Rocky Mountain hemlock-parsely (COSC2), mountain bluebells (MECI3), or marsh-marigold (PSLE).

D *Water sedge-planeleaf willow-marsh-marigold* Planeleaf willow cover is 10-20%; sometimes small quantities of other willows are present. Water sedge is prominent at >10%. Beaked sedge is sometimes prominent, as is tufted hairgrass (DECE).

E *Sedges-sparse planeleaf willow-yarrow-Baltic rush-dandelion* is dominated by water sedge, tufted hairgrass, and Baltic rush (JUARA4). Planeleaf willow is always present, but at <10% cover.

Table 15-5. Community types within *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*.

Community Type	No. samples	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Lr	Layer Height, m	Avg Layr Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod.[1], lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Planeleaf willow-taller willows-water sedge	4	10,058 (9,620-10,700) 1.5 (0-5)	34 (25-42) 67 (63-70) 67 (63-70)	1 (1-1) 1 (1-9) LS	S1 S2 GF S3 M	2.5 (1.8-3.0) 1.2 (0.6-2.5) 0.6 (0.0-1.6) 0.4 (0.0-0.6) 0.0	21.6 70.9 92.8 13.7 23.6	0 (0-0) 113 (79-186) 100 (84-127) 38 (8-84)	23 (12-36) 253 (181-329) 12.2 (9.1-17.4)	1618-2223 695-1234 20-219	43 (0-85) 50 (10-90) 100(100-100) 100(100-100) 73 (53-94)
B. Planeleaf willow-marsh-marigold-water sedge	4	10,963 (9,870-12,040) 1.1 (0-3)	28 (11-46) 54 (31-70) 21 (0-50)	1 (0-2) 4 (2-5) LS	S1 S2 GF S3 M	Missing 1.0 (0.4-1.7) 0.4 (0.0-1.2) 0.4 (0.0-0.6) 0.0	M 48.0 89.3 35.5 23.7	0 (0-0) 80 (66-95) 58 (23-86) 88 (37-113)	31 (19-49) 227 (156-269) 7.7 (5.5-9.9)	1311-1900 141-729 71-395	0 0 20 100 30
C. Planeleaf willow-moist sedges-Baltic rush-moist forbs	4	10,548 (9,540-11,040) 4.5 (2-7)	40 (34-45) 65 (62-70) 19 (0-31)	1 (1-2) 8 (3-12) LM	S1 S2 GF S3 M	Missing 0.6 (0.4-0.9) 0.3 (0.0-1.0) 0.4 (0.0-0.7) 0.0	M 78.2 89.2 61.1 44.9	0 (0-1) 89 (67-104) 89 (28-147) 37 (12-77)	22 (13-34) 215 (166-295) 10.5 (8.7-13.0)	1346-2015 171-1415 28-183	0 0 15 75 23
D. Water sedge-planeleaf willow-marsh-marigold	4	10,170 (9,920-10,390) 2.3 (0-4)	19 (14-24) 56 (41-70) 14 (11-16)	9 (1-9) 5 (1-18) LM-LS	S1 S2 GF S3 M	Missing 0.9 (0.3-1.9) 0.6 (0.0-1.0) Missing 0.0	M 75.0 80.6 M 22.1	0 (0-0) 17 (13-22) 118 (72-146) 43 (23-72)	31 (19-46) 178 (160-208) 6.5 (3.5-9.5)	142-236 558-1407 52-162	*
E. Sedges-sparse planeleaf willow-yarrow-Baltic rush-dandelion	3	9,920 (9,600-10,400) 2.5 (0-4)	41 (41-41) 38 (38-38) 26 (26-26)	1 (1-1) 18 (11-25) EM	*			0 (0-0) 20 (4-51) 101 (95-107) 36 (21-63)	27 (18-31) 157 (121-221) 6.1 (3.9-7.1)	46-899 845-993 50-127	25 25 40 80 43

*. Unknown: measurements were not taken in this CT.

Table 15-6. Resource Values for *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*. Resource values were calculated from the numbers in Table 15-5, relative to the whole UGB.

The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.

	Community Type				
Resource Value	**A**	**B**	**C**	**D**	**E**
Potential Cattle Forage Production	3	1	2-3	2	1-2
Grazing Suitability	4	1	3	2	2
Developed Recreation	1-2	1-2	1-2	1-2	1-2
Dispersed Recreation	2-3	2-3	2-3	2-3	2-3
Scenic	1	1	1	1	1
Road & Trail Stability	3-4	3-4	3-4	3-4	3-4
Construction Suitability	3-4	3-4	3-4	3-4	3-4
Deer & Elk Hiding Cover	1	1	1	1	1
Deer & Elk Forage & Browse	2	1	2	1	1
Sage Grouse Cover	5	4	4-5	3-4	4
Sage Grouse Lek Potential	2-3	2	2-3	2	2-3
Sage Grouse Nesting/Brood Potential	2-3	2-3	2-3	2-3	2-3
Sage Grouse Summer Potential	3-4	3-4	3-4	3-4	3-4
Need for Watershed Protection	2	2	2	3	3
Soil Stability	4	3	3	3	3
Risk of Soil Loss-Natural	1-2	1-2	1-2	1-2	1-2
Risk of Soil Loss-Management	2-3	2-3	2-3	2-3	2-3
Risk of Permanent Depletion-Range	3-4	3-4	3-4	3-4	3-4
Risk of Permanent Depletion-Wildlife	1-2	1-2	1-2	1-2	1-2
Resource Cost of Management	3	3	3	3	3
Cost of Rehabilitation	1-2	1-2	1-2	1-2	1-2

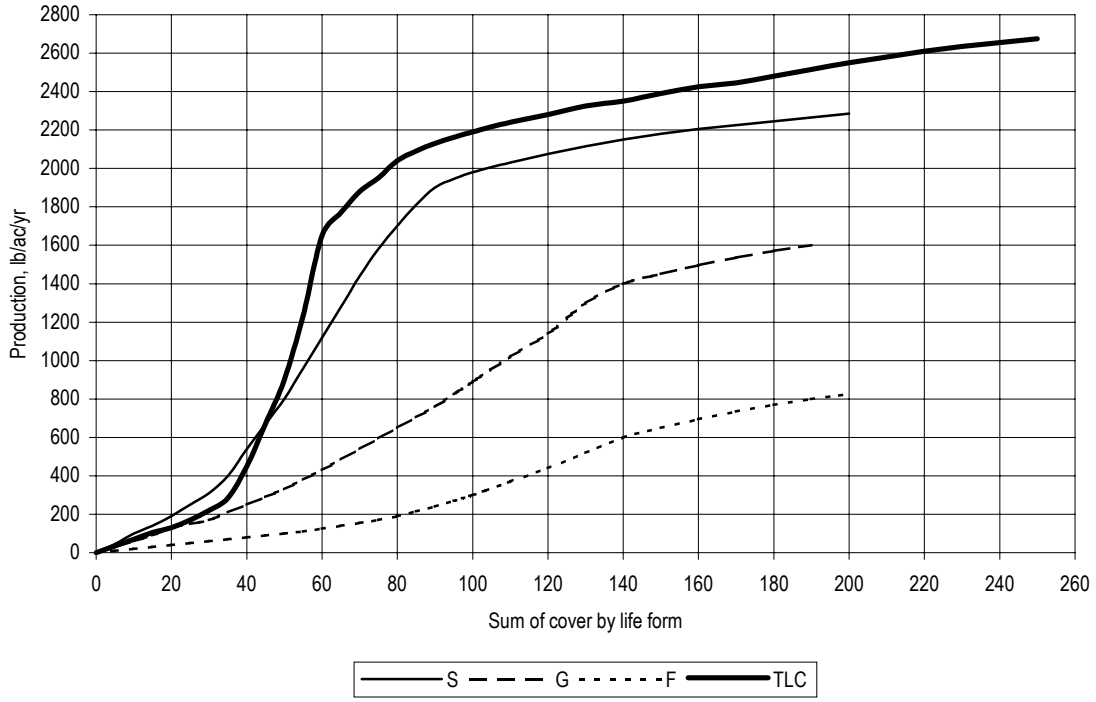


Figure 15-2. Relationship of cover by growth form and production. This is the SAPLSAWO (SAPL2-SAWO) model. S = shrubs, G = graminoids, F = forbs, and TLC = Total live cover.

Table 15-7. Common Species in *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*, where Characteristic cover > 10% or Constancy > 20%. "–" means that the species is not found. Dead cover is not listed. Ccv = Characteristic Cover, Con = Constancy. If Avc = Average Cover, then these are related using the formula Avc = Ccv•100%/Con.

	Community Type	A	B	C	D	E	
		Ccv(Con)	Ccv(Con)	Ccv(Con)	Ccv(Con)	Ccv(Con)	
Code	Species	N = 4	4	4	4	3	Common Name
	TREES						
PIEN	Picea engelmannii	T (25)	T (25)	T (50)	– –	– –	Engelmann spruce
	SHRUBS						
BEGL	Betula glandulosa	– –	– –	27 (75)	– –	– –	bog birch
PEFL15	Pentaphylloides floribunda	6 (25)	23 (25)	15 (25)	7 (25)	11 (67)	shrubby cinquefoil
SADR	Salix drummondiana	21 (50)	– –	– –	– –	– –	blue willow
SAGE2	Salix geyeriana	79 (25)	– –	– –	T (50)	22 (33)	Geyer willow
SAPL2	Salix planifolia	72(100)	75(100)	61(100)	14(100)	5(100)	planeleaf willow
VACE	Vaccinium cespitosum	– –	– –	10 (25)	– –	– –	dwarf bilberry
	GRAMINOIDS						
AGROS2	Agrostis	– –	– –	– –	20 (25)	– –	bentgrass
CACA4	Calamagrostis canadensis	23 (75)	15 (75)	23 (75)	37 (75)	– –	bluejoint reedgrass
CAAQ	Carex aquatilis	46(100)	7(100)	13 (50)	25(100)	53 (67)	water sedge
CAAT3	Carex athrostachya	– –	11 (25)	– –	– –	– –	slenderbeak sedge
CADI6	Carex disperma	– –	– –	24 (25)	– –	– –	soft leaved sedge
CAEB	Carex ebenea	– –	37 (25)	– –	– –	– –	ebony sedge
CAEG	Carex egglestonii	– –	– –	T (25)	19 (50)	– –	Eggleston sedge
CAMI7	Carex microptera	T (25)	– –	– –	– –	47 (33)	smallwing sedge
CAOC2	Carex occidentalis	– –	– –	33 (25)	– –	– –	western sedge
CASC12	Carex scopulorum	– –	– –	42 (50)	– –	– –	cliff sedge
CAUT	Carex utriculata	48 (50)	T (25)	– –	34 (50)	– –	beaked sedge
DECE	Deschampsia cespitosa	6 (50)	20 (75)	12 (75)	24 (75)	14 (67)	tufted hairgrass
ELPA3	Eleocharis palustris	24 (25)	– –	– –	– –	– –	creeping spike-rush
JUARA4	Juncus arcticus ssp. ater	– –	– –	63 (25)	T (25)	48 (67)	Baltic rush
PHCO9	Phleum commutatum	T (50)	4 (50)	T (25)	4 (25)	T (33)	alpine timothy
POPR	Poa pratensis	6 (25)	4 (50)	– –	13 (50)	2 (67)	Kentucky bluegrass
PORE	Poa reflexa	– –	12 (25)	– –	– –	– –	nodding bluegrass
	FORBS						
ACLA5	Achillea lanulosa	1 (50)	8 (75)	T (50)	5 (50)	2(100)	western yarrow
CACO6	Cardamine cordifolia	4 (50)	26 (25)	3 (25)	5 (75)	– –	heartleaf bittercress
CLRH2	Clementsia rhodantha	5 (25)	2 (75)	3 (50)	T (25)	2 (33)	rose crown
COSC2	Conioselinum scopulorum	11 (50)	7 (50)	33 (25)	1 (75)	T (33)	Rocky Mtn. hemlock-parsley
ERIGE2	Erigeron	1 (25)	– –	7 (50)	8 (25)	9 (33)	fleabane
ERPE3	Erigeron peregrinus	– –	14 (25)	– –	– –	– –	peregrine fleabane
FRVI	Fragaria virginiana	12 (25)	1 (25)	1 (25)	– –	3 (33)	Virginia strawberry
GASE6	Galium septentrionale	6 (25)	1 (25)	T (25)	1 (50)	T (33)	northern bedstraw
GEMA4	Geum macrophyllum	2 (25)	6 (25)	– –	1 (25)	6 (33)	large-leaved avens
MECI3	Mertensia ciliata	1 (50)	10 (75)	11 (25)	5 (25)	– –	mountain bluebells
PAPS5	Packera pseudaurea	– –	15 (25)	– –	– –	– –	golden groundsel
PEGR2	Pedicularis groenlandica	1 (50)	9 (25)	– –	1 (50)	– –	elephantella
PODI2	Potentilla diversifolia	1 (25)	2 (75)	T (50)	– –	– –	varileaf cinquefoil
PSLE	Psychrophila leptosepala	44 (25)	27(100)	21 (50)	12(100)	17 (67)	elkslip marsh-marigold
SETR	Senecio triangularis	– –	9 (50)	T (25)	11 (25)	– –	arrowleaf groundsel
STLO2	Stellaria longipes	– –	T (25)	2 (50)	– –	T (33)	long-stalked stitchwort
STUM	Stellaria umbellata	– –	2 (50)	– –	1 (50)	– –	umbellate starwort
TAOF	Taraxacum officinale	2 (50)	3 (25)	2 (25)	4 (50)	1(100)	common dandelion
VENU2	Veronica nutans	T (25)	2 (50)	T (25)	– –	– –	American alpine speedwell
VIOLA	Viola	8 (25)	4 (25)	2 (25)	T (50)	1 (33)	violet
	GROUND COVER						
.BARESO	bare soil	1 (25)	4 (75)	7 (50)	5(100)	18 (67)	
.LITTER	litter and duff	85(100)	88(100)	93(100)	87(100)	76(100)	
GRAVEL	gravel 0.2-10 cm	–	–	–	–	1	
.COBBLE	cobble 10-25 cm	– –	– –	– –	1 (25)	– –	
.STONES	stone > 25 cm	– –	1 (50)	2 (25)	9 (25)	– –	
.MOSSON	moss on soil	18(100)	17 (75)	45 (50)	27 (50)	– –	
LICHENS	lichens on soil	–	8	58	1	22	

WOLF AND PLANELEAF WILLOWS–COLD DEEP ALLUVIAL SOILS–BOTTOMS

Wolf-planeleaf willows/water sedge–Deep alluvial Cryaquolls and Cryohemists–
Flat to U-shaped floodplains and terraces, > 9,500 ft

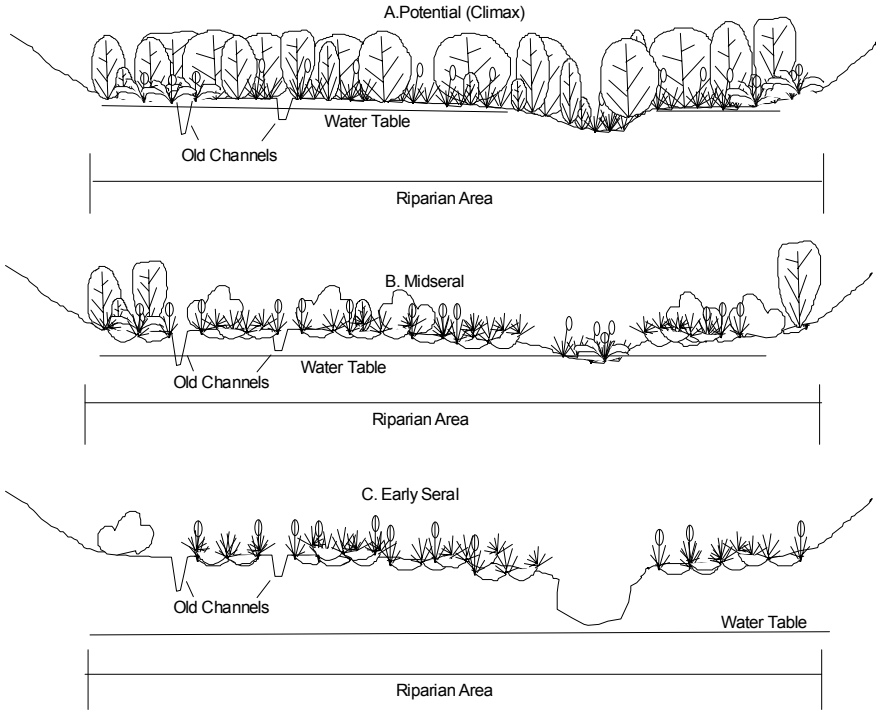


Figure 15-3. Cross-section of vegetation structure of three stages of *Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms*.

Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms is a common type on Subalpine floodplains and terraces, especially where there is significant cold air drainage. In the Gunnison Basin, it occurs on Subalpine streamsides and bogs. This type is apparently unknown elsewhere, although it might be expected in northwestern Colorado or northeastern Utah. *Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms* is characterized by Wolf willow (SAWO), planeleaf willow (SAPL2), water sedge (CAAQ), and tufted hairgrass (DECE); see Table 15-11 for common species names and codes. Other distinguishing features of this type include location on poorly-drained alluvial bottoms and bogs, short willows, and Cryaquolls or Histosols.

The plant association *Salix planifolia-Salix wolfii/Carex aquatilis* is described as new here. *Salix planifolia-Salix wolfii/Carex aquatilis* phase *Betula glandulosa* is also described as new here.

Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms is related to *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*, which occurs at slightly higher elevations, on slightly shallower, coarser soils, and lacks Wolf willow.

Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms is also related to *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales*, which occurs primarily in deep rainshadows on coarser soils, and lacks willows entirely. *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales* may represents an early seral stage (Fig. 15-4) of *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*.

The shrubby cinquefoil community occurs in rainshadows with dry climates, where evaporation is significant and willow stands are more susceptible to reduction in water tables. The sites of *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales* are in parks and swales where considerable, concentrated livestock grazing has occurred in past decades, which increased the amount of bare soil, and removed soil-binding species such as willows and wet sedges. The result was an abrupt drop in water table which killed the remaining willows.

Succession usually involves vegetation, land, water, and soil. In this cold climate, sites are usually distinguishable as riparian communities even at early seral stages. In very early seral to early seral stages, shrubs are absent, or dryland shrubs such as mountain big sagebrush or silver sagebrush are dominant with exotic bottomland species such as Kentucky bluegrass, dandelion, Baltic rush,

native dryland grasses, and assorted dryland forbs. The water table is usually low in summer and fall.

In early midseral to midseral stages, patchy willow cover (<50% across the site) dominates, composed of a mix of willows and cinquefoil. There is little to no reproduction of planeleaf or Wolf willow. Small patches of water sedge, tufted hairgrass, reedgrass, and moist-site forbs occur in low bottom microsites, but higher microsites support sagebrush, cinquefoil, bluegrass, dandelion, and dryland forbs. The water table is high in spring and remains high enough in summer and fall to keep the small, lowest microsites wet all year. In late midseral to potential natural community stages, willow cover exceeds 65% across the site and is continuous except in the wettest patches, which are uniformly dominated by water sedge, reedgrass, and other wet-site plants. Sagebrush, cinquefoil, Kentucky bluegrass, quackgrass, and dandelion are usually absent. The water table is high throughout the year, with standing water in the lowest microsites through the growing season.

Spruce riparian forests border this ecological type on higher-gradient sites upstream and downstream. Cold, moist spruce-fir forests occur on adjacent steep slopes with much better-drained soils. Thurber fescue grasslands adjoin this type on deeper, loamier, better-drained uplands.

Although technically forage for cattle is abundant here, the sites are seldom grazed except where there is heavy grazing pressure nearby. The sites are too wet, and there are too many holes in old channels for cattle. Horizontal obstruction varies from moderately high to very high. Deer and elk are rarely seen in these stands, probably because of the number of pits caused by old channels, but most stands could be good moose habitat. The sites are always under snow in winter. Deer and elk use of all community types is very low in the winter and low during spring through fall for forage, browse and cover.

A mixed planeleaf willow-Wolf willow/water sedge site, along the banks of the Taylor River in upper Taylor Park. Wolf willow 93% cover, water sedge 48%, bluejoint reedgrass 43%, planeleaf willow 8%. Coarse Fragments Cover = 0%, Total Live Cover = 279%, Coarse Fragments in Soil = 9. Soil sampled as a Fluvaquentic Cryosaprist, Euic. Matchless Mountain Quadrangle, elevation 9,520 ft, 1.3% WSW-facing slope. September 12, 1990.

A closer view of a Wolf willow-bog birch/water sedge site. The ground is completely covered. Wolf willow 50% cover, bog birch 48%, shrubby cinquefoil 8%, water sedge 89%, various sedge species 19%. Soil sampled as a Fluvaquentic Cryohemist, Euic. Whitepine Quadrangle, elevation 9,740 ft, 2% 226° (SW) slope. August 24, 1994.

Summary of Ecological Type Characteristics

1. Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

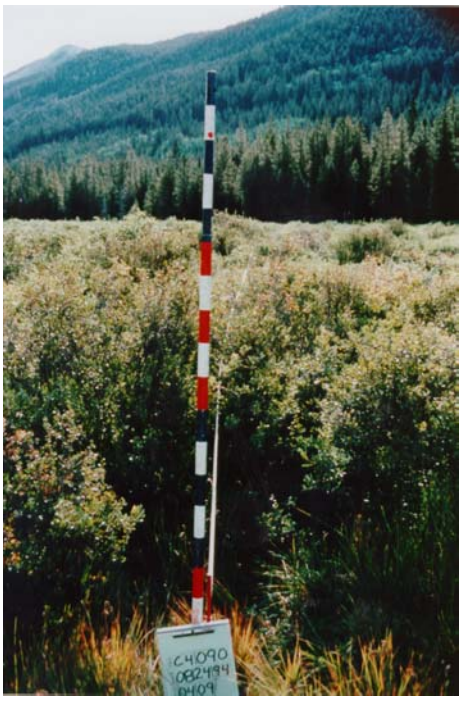
NUMBER OF SAMPLES	14, soil descriptions from 10 of these (total 14)
ELEVATION	9,895 ft (9,510-10,650 ft); 3,016 m (2,899-3,246 m)
AVERAGE ASPECT	161°M (r = 0.28)
LITHOLOGY	A variety, with granite [45%], shale [18%] and limestone [18%] leading
FORMATIONS[1]	A variety
LANDFORMS	Floodplains [69%] and terraces [31%]
SLOPE POSITIONS	Bottoms
SLOPE SHAPES	Flat [85%] to U-shaped [15%]
SLOPE ANGLE	1.9% (1-4%)
SOIL PARENT MATERIAL	All alluvial
COARSE FRAGMENTS	0.4% (0-6%) cover on surface, 14.5% (0-27%) by volume in soil
SOIL DEPTH	78 cm (60-100 cm); 30.6 in (24-39 in)
MOLLIC THICKNESS	53 cm (22-90 cm); 21.0 in (9-35 in)
TEXTURE	Organic surface [54%] to silty [23%] to loamy [15%]; subsurface is a wide variety of textures
SOIL CLASSIFICATION	Cryaquolls [83%] and Cryohemists [17%]
TOTAL LIVE COVER	259.8% (176.5-332.5%)
NUMBER OF SPECIES	24.2 (13-35)
TOTAL LIVE COVER/NO. SPECIES	11.6% (7.5-25.1%)
CLIMATE	Cold, wet to moderately wet lower Subalpine climate when sites are in good condition; in early seral stages, the microclimate is cool and moderately dry, when the water table drops and the soil surface is less shaded (Fig. 15-3).
WATER	At climax, sites are ponded seasonally or throughout the growing season. In early seral stages, the water table is lower (Fig. 15-3). The level of the water table changes with management, usually by manipulating the water-holding and sediment-holding capacities of the vegetation on site and along the water course.

Table 15-8. Resource Values for *Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms*. Resource values were calculated from the numbers in Table 15-9, relative to the whole UGB.

The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.

	Community Type	
Resource Value	**A**	**B**
Potential Cattle Forage Production	3-4	1-3
Grazing Suitability	ns[1]	ns[1]
Wetland	Yes	Yes
Riparian Area	Yes	Yes
Developed Recreation	ns[1]	ns[1]
Dispersed Recreation	0-1	0-1
Scenic	4-5	4-5
Road & Trail Stability	0-1	0-1
Construction Suitability	ns[1]	ns[1]
Deer & Elk Hiding Cover	4-5	6
Deer & Elk Forage & Browse	3-4	3-4
Need for Watershed Protection	4-5	4-5
Soil Stability	0-1	0-1
Risk of Soil Loss-Natural	1-2	1-2
Risk of Soil Loss-Management	5-6	5-6
Risk of Permanent Depletion-Range	ns[1]	ns[1]
Risk of Permanent Depletion-Wildlife	1-2	12
Resource Cost of Management	5-6	5-6
Cost of Rehabilitation	2-3	2-3

1. Not suitable.



A cold Wolf willow site (Community Type A). Wolf willow 53% cover, bog birch 48%, grayleaf willow 17%, water sedge 89%, various wet sedges 19%. Soil sampled as a Fluvaquentic Cryohemist, Euic. Whitepine Quadrangle, elevation 9,740 ft, 2% 226° (SW) bottom. August 24, 1994.

Key to Community Types

1. Total graminoid cover >90%. Water sedge usually dominating the understory, >20% cover, often >40%. Total sedge cover 45-120% ..... **A**
1. Total graminoid cover <90%. Water sedge absent to codominant with other graminoids, 0-30% cover. Total sedge cover 2-80% cover ..... **B**

Description of Community Types

A *Wolf willow-water sedge* is dominated by Wolf willow at 10-90% cover, planeleaf willow is sometimes codominant at 0-55% cover, or bog birch is codominant (BEGL) at 0-50% cover. Water sedge usually dominates the understory with 20-98% cover, but is sometimes mixed with other sedge species; total sedge cover ranges from 45 to 120%. Tufted hairgrass is sometimes absent, up to 35% cover.

B *Wolf-planeleaf willows-tufted hairgrass* is dominated by Wolf willow (5-95% cover) or planeleaf willow (Trace-70% cover); bog birch is usually absent. Water sedge is sometimes absent, up to 30% cover; total sedge cover ranges from 2 to 80%. Tufted hairgrass is always present from tract to 50% cover.

Table 15-9. Community types within *Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms*.

Community Type	No. samples	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Layer Height, m Lr	Avg Layr Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod.[1], lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Wolf willow-water sedge	10	9,944 (9,510-10,650) 2.2 (1-4)	14 (0-22) 81 (70-100) 50 (22-90)	6 (1-6) 100 (11-100) LS	S1 1.0 (0.2-2.0) S2 0.5 (0.0-0.8) GF 0.3 (0.0-1.0) M 0.0	70.9 25.8 95.4 17.5	0 (0-1) 110 (76-167) 111 (76-158) 49 (7-105)	23 (13-30) 272 (177-333) 12.8 (8.6-25.1)	1547-2202 599-1491 17-341	28 (0-60) 52 (25-95) 83 (70-100) 100(100-100) 66 (49-89)
B. Wolf-planeleaf willows-tufted hairgrass	4	9,785 (9,620-10,110) 1.3 (1-2)	17 (8-27) 65 (60-70) 65 (60-70)	* 6 (2-10) LM	S1 1.5 (0.8-2.5) S2 0.6 (0.0-1.6) GF 0.3 (0.0-1.3) M 0.0	29.9 64.6 94.0 7.7	0 (0-0) 79 (40-102) 70 (25-89) 80 (45-94)	27 (20-35) 229 (208-277) 8.6 (7.5-11.0)	593-1994 154-768 84-270	*

*. Unknown: measurements were not taken in this CT.

Table 15-10. Wildlife values (relative to the whole UGB) for the principal wildlife species using *Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms*.

CT	Mule Deer Season–Preference	Elk Season–Preference
All	Winter, Any– Very Low Spring/Fall– Low (Forage, Browse, Cover)	Winter, Any– Very Low Spring/Fall– Low (Forage, Browse, Cover)

Table 15-11. Common Species in *Wolf and planeleaf willows–Cold deep alluvial soils–Bottoms*, where Characteristic cover > 10% or Constancy > 20%. "–" means that the species is not found. Dead cover is not listed. Ccv = Characteristic Cover, Con = Constancy. If Avc = Average Cover, then these are related using the formula Avc = Ccv•100%/Con.

Code	Community Type Species	A Ccv (Con) N = 10	B Ccv (Con) 4	Common Name
	SHRUBS			
BEGL	Betula glandulosa	20 (50)	T (25)	bog birch
PEFL15	Pentaphylloides floribunda	5 (80)	15 (75)	shrubby cinquefoil
SADR	Salix drummondiana	2 (20)	7 (25)	blue willow
SAGL	Salix glauca	17 (10)	– –	grayleaf willow
SAMO2	Salix monticola	33 (40)	9 (50)	serviceberry willow
SAPL2	Salix planifolia	36 (80)	9 (100)	planeleaf willow
SAWO	Salix wolfii	52 (100)	51 (100)	Wolf willow

Table 15-11. (Continued)

Code	Community Type / Species	A Ccv (Con) N = 10	B Ccv (Con) 4	Common Name
	GRAMINOIDS			
ACHNA	Achnatherum	8 (20)	1 (25)	needlegrass
AGROS2	Agrostis	13 (10)	– –	bentgrass
CACA4	Calamagrostis canadensis	19 (60)	34 (50)	bluejoint reedgrass
CAREX	Carex	19 (10)	– –	sedge
CAAL6	Carex albonigra	12 (30)	– –	blackhead sedge
CAAQ	Carex aquatilis	62 (100)	9 (75)	water sedge
CABE2	Carex bebbii	36 (20)	– –	Bebb's sedge
CACA12	Carex capillaris	15 (10)	– –	hair sedge
CADI6	Carex disperma	24 (10)	– –	soft leaved sedge
CAEG	Carex egglestonii	1 (20)	8 (25)	Eggleston sedge
CAFO3	Carex foenea	20 (10)	– –	silvertop sedge
CASI2	Carex simulata	– –	31 (25)	short-beaked sedge
CAUT	Carex utriculata	3 (40)	– –	beaked sedge
DECE	Deschampsia cespitosa	12 (70)	19 (100)	tufted hairgrass
ELTR7	Elymus trachycaulus	T (20)	1 (25)	slender wheatgrass
ELRE3	Elytrigia repens	– –	5 (75)	creeping quackgrass
FEID	Festuca idahoensis	– –	16 (25)	Idaho fescue
JUARA4	Juncus arcticus ssp. ater	8 (50)	– –	Baltic rush
LUPA4	Luzula parviflora	1 (20)	T (25)	millet woodrush
	FORBS			
ACLA5	Achillea lanulosa	2 (60)	8 (75)	western yarrow
ACCO4	Aconitum columbianum	3 (20)	9 (25)	Columbian monkshood
ASTER	Aster	– –	10 (25)	aster
ASSP16	Aster spathulatus	11 (20)	– –	western aster
CACO6	Cardamine cordifolia	5 (20)	1 (25)	heartleaf bittercress
COSC2	Conioselinum scopulorum	4 (30)	7 (25)	Rocky Mtn. hemlock-parsley
ERIGE2	Erigeron	4 (10)	16 (50)	fleabane
FRVI	Fragaria virginiana	3 (60)	7 (75)	Virginia strawberry
GEMA4	Geum macrophyllum	3 (50)	1 (25)	large-leaved avens
MECI3	Mertensia ciliata	6 (10)	28 (25)	mountain bluebells
MIGU	Mimulus guttatus	10 (10)	– –	common monkey flower
MIPE	Mitella pentandra	25 (10)	– –	five-stamen miterwort
OSCH	Osmorhiza chilensis	4 (50)	1 (25)	sweet cicely
OXFE	Oxypolis fendleri	10 (10)	– –	Fendler cowbane
PEGR2	Pedicularis groenlandica	6 (70)	3 (25)	elephantella
POFO	Polemonium foliosissimum	10 (10)	– –	sky pilot
POPU3	Polemonium pulcherrimum	2 (20)	4 (25)	Jacob's ladder
POGR9	Potentilla gracilis	– –	11 (25)	northwest cinquefoil
PSLE	Psychrophila leptosepala	22 (20)	2 (50)	elkslip marsh-marigold
SENEC	Senecio	10 (30)	1 (25)	groundsel
SETR	Senecio triangularis	25 (10)	4 (25)	arrowleaf groundsel
SINE3	Sidalcea neomexicana	30 (10)	– –	New Mexican checker mallow
SWPE	Swertia perennis	11 (20)	– –	star gentian
TAOF	Taraxacum officinale	1 (60)	15 (75)	common dandelion
THAL	Thalictrum alpinum	5 (10)	5 (50)	alpine meadow-rue
THFE	Thalictrum fendleri	6 (20)	13 (50)	Fendler meadow-rue
VAED	Valeriana edulis	7 (40)	12 (25)	edible valerian
VIOLA	Viola	4 (20)	4 (50)	violet
	FERNS & FERN-ALLIES			
EQAR	Equisetum arvense	6 (30)	2 (25)	field horsetail
	GROUND COVER			
.BARESO	bare soil	100 (10)	6 (50)	
.LITTER	litter and duff	96 (80)	96 (100)	
GRAVEL	gravel 0.2-10 cm	–	–	
.COBBLE	cobble 10-25 cm	– –	– –	
.STONES	stone > 25 cm	– –	– –	
.MOSSON	moss on soil	36 (50)	11 (50)	
LICHENS	lichens on soil	–	–	

SHRUBBY CINQUEFOIL–COLLUVIAL OR ALLUVIAL SOILS–PARKS AND SWALES

Shrubby cinquefoil/Idaho fescue–Moderately deep colluvial to alluvial clayey Cryoborolls–
Linear to concave to U-shaped footslopes and draw bottoms, 9,000-10,800 ft

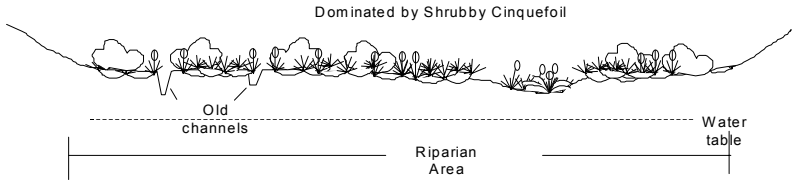


Figure 15-4. Cross-section of vegetation structure of *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales*.

Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales is found occasionally in parks and swales in deep rainshadows. In the Gunnison Basin, this type occurs in moist rocky bottoms, benches, and slopes. This type is also known from throughout the Rocky Mountains from western Montana (Hansen and others 1988) and western Wyoming and eastern Idaho, and through the mountains of northwestern Colorado. All of these descriptions to date have been from rainshadow climates.

Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales is characterized by shrubby cinquefoil (PEFL15), Idaho fescue (FEID) or Rocky Mountain fescue (FESA), and yarrow (ACLA5); see Table 15-15 for common species names and codes. Other distinguishing features include deep-Mollic Cryoborolls with much organic matter and location in deep rainshadows. Landforms and soils in the "ecological type" are closely similar to those of earlier seral stages of *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*.

Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales occurs primarily in deep rainshadows on coarser soils, and lacks willows and wet sedges entirely. In my opinion, *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales* represents an earlier seral stage (Fig. 15-1B, Fig. 15-4) of *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*. The dominance by increasers and invaders in this shrubby cinquefoil community indicates that it is probably the result of disturbance. Because of the dry climate in rainshadows, evaporation is significant, making willow stands there more susceptible to reduction in water tables.

The sites of *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales* all occur in parks and swales where considerable, concentrated livestock grazing has occurred in past decades. Heavy use seems to have increased the amount of bare soil in these stands and removed soil-binding species such as willows and wet sedges. The result was an abrupt drop in water table which eliminated the remaining willows. So it is likely that these communities are permanent disclimaxes to another riparian type, planeleaf willow/water sedge.

However, I choose to maintain this as a separate Ecological Type in spite of these indications for the following reasons:

- The plant association of this ET has been described elsewhere as "climax" (Mueggler and Stewart 1980, Tweit and Houston 1980).
- This community would be more difficult to key out as a Community Type than as an Ecological Type.

Restoration of this type to a riparian willow community would require considerable time, money and energy on the part of resource managers.

The plant association *Pentaphylloides floribunda/Festuca idahoensis* has been described by Tweit and Houston (1980) and Mueggler and Stewart (1980).

Spruce riparian forests occur on adjacent higher-gradient sites upstream and downstream. Cold, moist spruce-fir forests adjoin this type on steep slopes with much better-drained soils. Thurber fescue grasslands border this type on deeper, loamier, better-drained uplands.

Horizontal obstruction is uniformly moderately low to moderate, all within 1 meter of the surface. Hiding cover potential for deer and elk is low to moderately low. Sometimes deer bed in these communities, but otherwise deer and elk are seldom seen in these sites.

None of the sites are usable winter range. Deer use of Community Type A and B is low in winter and moderately low in spring through fall; elk use is always low. Deer and elk use of Community Type C is always low.

Summary of Ecological Type Characteristics

1. Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

NUMBER OF SAMPLES	10, soil descriptions from 2 of these (total 10)
ELEVATION	9,768 ft (9,080-10,760 ft); 2,977 m (2,767-3,279 m)
AVERAGE ASPECT	207°M (r = 0.20)
LITHOLOGY	A wide variety
FORMATIONS	[1]A wide variety
LANDFORMS	Soil creep slopes [90%] and draws [10%]
SLOPE POSITIONS	Footslopes [70%] and toeslopes [30%]
SLOPE SHAPES	Usually concave at least vertically, sometimes U-shaped
SLOPE ANGLE	12.2% (3-47%)
SOIL PARENT MATERIAL	Colluvium [77%] or alluvium [23%]
COARSE FRAGMENTS	4.6% (0-18%) cover on surface, 42.4% (32-53%) by volume in soil
SOIL DEPTH	54 cm (52-56 cm); 21.3 in (20-22 in)
MOLLIC THICKNESS	25 cm (22-28 cm); 9.8 in (9-11 in)
TEXTURE	Surface is Loam-clay loam-silt loam; subsurface is clay-clay loam-sandy clay
SOIL CLASSIFICATION	All Cryoborolls, some Argic [40%], Moderately deep
TOTAL LIVE COVER	184.3% (110.8-311.0%)
NUMBER OF SPECIES	26.3 (12-41)
TOTAL LIVE COVER/NO. SPECIES	8.6% (3.0-19.8%)
CLIMATE	Cold, moderately dry Subalpine climate.
WATER	Water table usually far below the surface (Fig. 15-4).

Table 15-12. Wildlife values (relative to the whole UGB) for the principal wildlife species using *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales*. "|" means the same as above.

	Mule Deer	Elk
CT	Season–Preference	Season–Preference
A, B	Winter, Any– Low Spring/Fall– Mod. Low (Overnight)	Winter, Any– Low Spring/Fall–Low
C	Winter, Any– Low Spring/Fall–Low (Overnight)	|

Key to Community Types

1. Kentucky bluegrass (POPR) prominent and >20% cover. Shrubby cinquefoil sharing dominance with one or more sagebrush species (ARTRV, ARAR8, ARCA13)..... **A**
1. Kentucky bluegrass absent or very minor, usually <5% cover. Shrubby cinquefoil the leading shrub (more cover than any others..... (2)

2. Idaho fescue (FEID) prominent, >10% cover, often >30% ..... **B**
2. Idaho fescue absent to <10% cover .....**C**

Description of Community Types

A *Kentucky bluegrass-shrubby cinquefoil* is dominated by lush growth of Kentucky bluegrass, 20-100% cover. Shrubby cinquefoil, 10-25% cover, is codominant with one or more sagebrush species, 20-40% cover. Elk sedge (CAGE2) is sometimes prominent.

B *Shrubby cinquefoil-Idaho fescue-yarrow* is dominated by shrubby cinquefoil, 10-20% cover, and Idaho fescue, 10-45% cover. Kentucky bluegrass and elk sedge are absent or minor.

C *Shrubby cinquefoil-dry grasses and forbs* is dominated by shrubby cinquefoil with a variety of dry grasses and forbs, such as Thurber fescue (FETH), Rocky Mountain fescue (FESA), or muttongrass (POFE).

Table 15-13. Community types within *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales*.

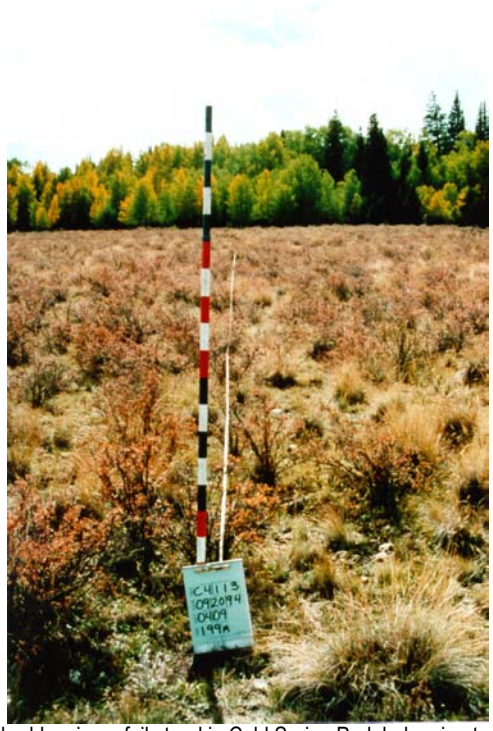
Community Type	No. samples	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Layer Height, m Lr	Avg Layr Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod.[1], lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Kentucky bluegrass-shrubby cinquefoil	3	9,407 (9,080-9,620) 15.0 (10-23)	* * *	5 14 (2-14) EM	*		2 (0-6) 53 (41-65) 143 (105-170) 74 (26-110)	16 (12-19) 272 (237-311) 17.0 (14.0-19.8)	617-1288 972-1551 56-374	*
B. Shrubby cinquefoil-Idaho fescue-yarrow	3	10,277 (10,030-10,760) 4.8 (3-7)	32 56 22	1 (1-1) 16 (6-25) EM	S1 0.5 (0.3-0.8) GF 0.2 (0.0-0.6) S2 Missing L 0.0	28 91 M 16	0 (0-0) 18 (15-20) 78 (47-118) 58 (40-91)	35 (27-41) 154 (111-228) 4.4 (3.0-6.2)	164-218 303-1137 74-253	0 0 5 95 25
C. Shrubby cinquefoil-dry grasses and forbs	4	9,658 (9,200-10,165) 15.7 (3-47)	53 52 28	8 (2-18) 21 (6-60) ES	S1 0.5 (0.3-0.7) GF 0.4 (0.0-0.8) S2 0.1 (0.0-0.3) L Missing	38 89 1 M	0 (0-0) 38 (2-75) 55 (37-79) 49 (17-77)	27 (22-40) 142 (113-185) 5.3 (4.6-6.7)	22-1531 229-637 40-180	0 0 5 80 21

*. Unknown: measurements were not taken in this CT.

Table 15-14. Resource Values for *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales*. Resource values were calculated from the numbers in Table 15-13, relative to the whole UGB.

The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.

	Community Type				Community Type		
Resource Value	**A**	**B**	**C**	**Resource Value**	**A**	**B**	**C**
Potential Cattle Forage Production	3-4	2-4	1-2	Deer & Elk Forage & Browse	1-2	1-2	1-2
Grazing Suitability	3	3	2	Need for Watershed Protection	2	2	2
Wetland	No	No	No	Soil Stability	3	3	3
Riparian Area	No	No	No	Risk of Soil Loss-Natural	3	3	3
Developed Recreation	2	2	2	Risk of Soil Loss-Management	3-4	3-4	3-4
Dispersed Recreation	2	2	2	Risk of Permanent Depletion-Range	2-3	2-3	3-4
Scenic	1-2	1-2	1-2	Risk of Permanent Depletion-Wildlife	1-2	1-2	1-2
Road & Trail Stability	2-3	2-3	2-3	Resource Cost of Management	4	4	4
Construction Suitability	2	2	2	Cost of Rehabilitation	3-5	3-5	3-5
Deer & Elk Hiding Cover	2-3	2-3	2-3				



A shrubby cinquefoil stand in Cold Spring Park belonging to the *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales* type (Community Type C), with no sign of willows. This stand, and the many like it, are not definitely assignable to any riparian type, so I have created a type for these cinquefoil-dominated stands. Based on soils, it is fairly certain that these belong to one or another of the planeleaf willow-Wolf willow types. Rocky Mountain fescue 33%, shrubby cinquefoil 29%, Thurber fescue 27%, prairie smoke 15%. Coarse Fragments Cover = 8%, Total Live Cover = 185%, Coarse Fragments in Soil = 42. Soil sampled as an Argic Cryoboroll, Clayey-Skeletal, Montmorillonitic – probably used to be an Histosol. Cold Spring Park Quadrangle, elevation 10,165 ft, 4% 056° (NE) slope. September 20, 1994.

For comparison, notice the similarity between the picture on the left and this early seral stage of *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms* (Community Type C), with dominance by shrubby cinquefoil (dull purplish brown shrub) with a few planeleaf willows (orange shrub), and some less-wet species such as tufted hairgrass. This site has been moderately to moderately heavily grazed for many years. Baltic rush 63% cover, planeleaf willow 38%, tufted hairgrass 36%, western Indian paintbrush 33%, shrubby cinquefoil 15%, bluejoint reedgrass 13%, bog birch 11%, barrenground willow 3%, water sedge 2%. Coarse Fragments Cover = 3%, Total Live Cover = 231%, Coarse Fragments in Soil = 39. Soil sampled as an Histic Cryaquoll. Gothic Quadrangle, elevation 9,540 ft, 1.8% 074° (E) slope. September 27, 1994.

Table 15-15. Common Species in *Shrubby cinquefoil–Colluvial or alluvial soils–Parks and swales*, where Characteristic cover > 10% or Constancy > 20%. "–" means that the species is not found. Dead cover is not listed. Ccv = Characteristic Cover, Con = Constancy. If Avc = Average Cover, then these are related using the formula Avc = Ccv•100%/Con.

	Community Type	A	B	C	
		Ccv (Con)	Ccv (Con)	Ccv (Con)	
Code	Species	N = 3	3	4	Common Name
	SHRUBS				
ARAR8	Artemisia arbuscula	40 (33)	– –	– –	low sagebrush
ARTRV	Artemisia tridentata ssp. vaseyana	25 (67)	– –	T (25)	mountain big sagebrush
PEFL15	Pentaphylloides floribunda	13 (100)	17 (100)	37 (100)	shrubby cinquefoil
ROWO	Rosa woodsii	15 (33)	– –	5 (25)	Woods rose
	GRAMINOIDS				
ACPI2	Achnatherum pinetorum	10 (33)	– –	– –	pine needlegrass
AGSC5	Agrostis scabra	– –	2 (67)	1 (25)	rough bentgrass
BRCA10	Bromopsis canadensis	5 (33)	– –	1 (25)	fringed brome
BRPO5	Bromopsis porteri	– –	10 (33)	– –	nodding brome
CAGE2	Carex geyeri	35 (67)	1 (67)	6 (50)	elk sedge
CAOB4	Carex obtusata	– –	40 (33)	11 (25)	blunt sedge
DAIN	Danthonia intermedia	– –	2 (67)	– –	timber oatgrass
DAPA2	Danthonia parryi	35 (33)	– –	T (25)	Parry oatgrass
DECE	Deschampsia cespitosa	– –	– –	3 (50)	tufted hairgrass
ELEL5	Elymus elymoides	5 (67)	– –	2 (50)	bottlebrush squirreltail
ELTR7	Elymus trachycaulus	– –	4 (33)	1 (50)	slender wheatgrass
ELRE3	Elytrigia repens	– –	1 (33)	3 (25)	creeping quackgrass
FEID	Festuca idahoensis	10 (33)	32 (100)	1 (75)	Idaho fescue
FESA	Festuca saximontana	– –	– –	33 (25)	Rocky Mountain fescue
FETH	Festuca thurberi	15 (67)	11 (67)	34 (50)	Thurber fescue
JUARA4	Juncus arcticus ssp. ater	10 (33)	– –	– –	Baltic rush
KOMA	Koeleria macrantha	5 (33)	3 (33)	3 (50)	prairie junegrass
POFE	Poa fendleriana	20 (33)	19 (67)	30 (50)	muttongrass
POPR	Poa pratensis	73 (100)	– –	– –	Kentucky bluegrass
	FORBS				
ACLA5	Achillea lanulosa	10 (33)	4 (100)	5 (100)	western yarrow
AGGL	Agoseris glauca	– –	2 (67)	1 (50)	false-dandelion
AMLA6	Amerosedum lanceolatum	– –	T (67)	– –	yellow stonecrop
ANRO2	Antennaria rosea	20 (33)	2 (67)	2 (25)	rose pussytoes
ASAL7	Astragalus alpinus	– –	12 (33)	8 (25)	alpine milkvetch
BODR	Boechera drummondii	– –	1 (67)	T (25)	false-arabis
CARO2	Campanula rotundifolia	– –	T (33)	15 (25)	common harebell
CEFO2	Cerastium fontanum	– –	4 (100)	– –	mouse-ear
CISC3	Cirsium scopulorum	– –	3 (33)	2 (50)	Alpine thistle
DEIN5	Descurainia incana	– –	T (33)	1 (50)	Richardson tansy mustard
ERCO24	Eremogone congesta	28 (67)	– –	– –	desert sandwort
ERFL	Erigeron flagellaris	– –	– –	25 (25)	trailing fleabane
ERSP4	Erigeron speciosus	10 (67)	5 (67)	– –	Oregon fleabane
ERSU11	Eriogonum subalpinum	5 (67)	– –	6 (25)	sulfurflower
ERTR19	Erythrocoma triflora	– –	5 (67)	10 (50)	prairie smoke
FRVI	Fragaria virginiana	– –	2 (67)	T (25)	Virginia strawberry
GASE6	Galium septentrionale	– –	2 (33)	5 (25)	northern bedstraw
GADR3	Gastrolychnis drummondii	– –	T (67)	T (25)	alpine campion
GEAC2	Gentianella acuta	– –	2 (33)	1 (25)	little gentian
HEVI4	Heterotheca villosa	– –	– –	2 (75)	hairy golden aster
IRMI	Iris missouriensis	5 (67)	T (33)	– –	wild iris
NOMO2	Noccaea montana	– –	T (33)	T (25)	candytuft
ORALP	Oreoxis alpina ssp. puberulenta	– –	30 (33)	– –	alpine-parsely
PEGR2	Pedicularis groenlandica	– –	T (33)	2 (25)	elephantella
PNAF	Pneumonanthe affinis	– –	T (67)	1 (25)	bottle gentian
POFO	Polemonium foliosissimum	– –	17 (33)	– –	sky pilot
PODO4	Polygonum douglasii	– –	T (67)	– –	Douglas knotweed
POHI6	Potentilla hippiana	– –	6 (33)	3 (100)	horse cinquefoil
POPU9	Potentilla pulcherrima	20 (33)	T (33)	3 (50)	beauty cinquefoil
PSMO	Pseudocymopterus montanus	– –	3 (33)	T (25)	mountain parsely
SEDE2	Selaginella densa	– –	T (33)	T (25)	little club-moss
SEIN2	Senecio integerrimus	– –	2 (67)	2 (25)	lambs-tongue groundsel
TAOF	Taraxacum officinale	35 (67)	4 (67)	16 (50)	common dandelion
THMO6	Thermopsis montana	5 (33)	– –	1 (25)	golden banner
VIAD	Viola adunca	– –	T (33)	1 (25)	hook violet
	GROUND COVER				
.BARESO	bare soil	14 (33)	16 (100)	21 (100)	
.LITTER	litter and duff	81 (33)	81 (100)	71 (100)	
GRAVEL	gravel 0.2-10 cm	–	–	3	
.COBBLE	cobble 10-25 cm	– –	– –	2 (25)	
.STONES	stone > 25 cm	– –	– –	– –	
.MOSSON	moss on soil	– –	1 (33)	– –	
LICHENS	lichens on soil	–	9	6	

PLANELEAF WILLOW/MARSH-MARIGOLD–COLD, WET YOUNG SOILS–HIGH BOTTOMS

Planeleaf willow/marsh-marigold–Cryaquepts–Concave footslopes and lower backslopes, > 11,500 ft

Figure 15-5. Cross-section of vegetation structure of *Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms*. The tallest shrub layer typically averages 1.6 ft tall. Aspects are non-northerly, and slope angles average 12%.

Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms is an uncommon type on high-elevation bottoms and footslopes. Soils are cold to very cold. It occurs on upper Subalpine streamsides and moist gentle slopes in the Gunnison Basin. This type is apparently only known from west-central Colorado. *Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms* is characterized by planeleaf willow (SAPL2), marsh-marigold (PSLE) and mountain bluebells (MECI3); see Table 15-19 for common species names and codes. Other distinguishing features include location in upper-Subalpine moist riparian areas and Cryaquepts.

Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms is closely related to *Planeleaf willow/water sedge–Cold deep alluvial soils–Bottoms*, which occurs at lower elevations on somewhat warmer, less coarse soils. Floristically, they are very similar, except that the former lacks water sedge and other wet-site sedges.

The plant association *Salix planifolia/ Psychrophila leptosepala* has been described by Hess (1982) and Johnston (1987).

Succession usually involves vegetation, land, water, and soil. Because of the cold climate, these sites are usually distinguishable as riparian communities even in early seral stages. In very early seral to early seral stages, there are no shrubs, or dryland shrubs such as mountain big sagebrush (ARTRV) or silver sagebrush (ARCA13) dominate, with an understory of exotic bottomland species such as Kentucky bluegrass (POPR), dandelion (TAOF), Baltic rush (JUAR3), native dryland grasses, and assorted dryland forbs. The water table is usually low in summer and fall.

In early midseral to midseral stages, the site is dominated by patchy willow cover (<50% across the site), consisting of a mix of willows and shrubby cinquefoil (PEFL15) . There is little to no reproduction of planeleaf or Wolf willow. Small patches of water sedge (CAAQ), tufted hairgrass (DECE), reedgrass (CACA4), and moist-site forbs occur in low bottom microsites, but higher microsites support sagebrush, shrubby cinquefoil, bluegrass, dandelion, and dryland forbs. The water table is high in spring and remains high enough through summer and fall to keep the small, lowest microsites wet all year.

In late midseral to potential natural community stages, willow cover is >65% across the site and is continuous except in the wettest patches, which are uniformly dominated by water sedge, reedgrass, and other wet-site plants. Sagebrush, cinquefoil, Kentucky bluegrass, quackgrass, and dandelion are usually absent. The water table is high throughout the year, maintaining standing water in the lowest microsites through the growing season.

Spruce riparian forests adjoin this type on higher-gradient sites upstream and downstream. Cold, moist spruce-fir forests occur on adjacent steep slopes with much better-drained soils. Thurber fescue grasslands border this type on deeper, loamier, better-drained uplands.

These sites are unsuitable as cattle range. Horizontal obstruction has not yet been measured, but it is likely to be moderately high. Deer and elk use these stands, which are located high in their summer ranges. Deer and elk use of all community types is low in the winter, and moderately low spring through fall for cover and browse, and forage for elk. The later-seral sites would make good moose habitat.

Table 15-16. Wildlife values (relative to the whole UGB) for the principal wildlife species using *Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms*.		
CT	Mule Deer Season–Preference	Elk Season–Preference
All	Winter, Any– Very Low Spring/Fall– Mod. Low (Cover, Browse)	Winter, Any– Very Low Spring/Fall– Mod. Low (Cover, Browse, Forage)

Summary of Ecological Type Characteristics

1. Explanation of symbols in Appendix A. Percentages in [brackets] indicate the percentage of plots sampled that have that characteristic.

NUMBER OF SAMPLES	2, soil descriptions from neither of these (total 2)
ELEVATION	11,963 ft (11,640-12,285 ft); 3,646 m (3,548-3,744 m)
AVERAGE ASPECT	207°M (r = 0.20)
LITHOLOGY	Granite, rhyolite, breccia
FORMATIONS[1]	Xg, Tiql, Tpl
LANDFORMS	Soil creep slopes [60%] and swales [40%]
SLOPE POSITIONS	Footslopes and lower backslopes
SLOPE SHAPES	Always concave at least vertically
SLOPE ANGLE	3.9% (3-4%)
SOIL PARENT MATERIAL	Colluvium
COARSE FRAGMENTS	1% cover on surface
TOTAL LIVE COVER	154.8% (139.8-169.8%)
NUMBER OF SPECIES	27.5 (26-29)
TOTAL LIVE COVER/NO. SPECIES	5.7% (4.8-6.5%)
CLIMATE	Cold, moist to wet, upper Subalpine-lower Alpine.
WATER	Water is in liquid form very little of the year, and only a fraction of the day.

A typical planeleaf willow/marsh-marigold stand in the upper Subalpine Zone, forming the ecotone with the Alpine Zone just above. Nearly complete cover by planeleaf willow. West Elk Peak Quadrangle, elevation 11,640 ft, 3.5% SE-facing slope. August 28, 1982.

Community Type

A *Planeleaf willow-sparse marsh-marigold-sparse bluebells* has planeleaf willow dominant, 90-100% cover. There are few other shrubs, and the herbaceous understory is moderately sparse: there are few understory species >10% cover.

Table 15-17. Community types within *Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms*.

Community Type	No. samples	Elevation, ft Slope, %	Coarseness, % Depth, cm Mollic Depth, cm	Surface Coarse, % Bare, % Seral Stage	Layer Height, m Lr Avg Layr Cvr %	Cover, %: Trees Shrubs Graminoids Forbs	No. Species Total Live Cover, % TLC/NS, %	Prod.[1], lb/ac/yr Shrubs Gramin. Forbs	Obstruct'n %: 1.5-2.0 m 1.0-1.5 m 0.5-1.0 m 0.0-0.5 m Total<2m
A. Planeleaf willow-sparse marsh-marigold-sparse bluebells	2	11,963 (11,640-12,285) 3.9 (3-4)	* 33 (20-46) 0 (0-0)	1 5	*	0 (0-0) 100 (100-100) 8 (1-16) 47 (39-54)	28 (26-29) 155 (140-170) 5.7 (4.8-6.5)	1967-1967 5-96 73-102	*

*. Unknown: measurements were not taken in this CT.

Table 15-18. Resource Values for *Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms*. Resource values were calculated from the numbers in Table 15-17, relative to the whole UGB.

The numbers in this table can be translated: 0 = Very Low, 1 = Low, 2 = Moderately Low, 3 = Moderate, 4 = Moderately High, 5 = High, and 6 = Very High.

	Community Type
Resource Value	**A**
Potential Cattle Forage Production	0-1
Grazing Suitability	ns[1]
Wetland	Yes
Riparian Area	Yes
Developed Recreation	ns[1]
Dispersed Recreation	0-1
Scenic	4-5
Road & Trail Stability	0-1
Construction Suitability	ns[1]
Deer & Elk Hiding Cover	4
Deer & Elk Forage & Browse	3-4
Need for Watershed Protection	4-5
Soil Stability	2-3
Risk of Soil Loss-Natural	2-3
Risk of Soil Loss-Management	5-6
Risk of Permanent Depletion-Range	ns[1]
Risk of Permanent Depletion-Wildlife	3-4
Resource Cost of Management	5-6
Cost of Rehabilitation	5

1. ns = Not suitable.

Table 15-19. Common Species in *Planeleaf willow/marsh-marigold–Cold, wet young soils–High bottoms*, where Characteristic cover > 10% or Constancy > 20%. "–" means that the species is not found. Dead cover is not listed. Ccv = Characteristic Cover, Con = Constancy. If Avc = Average Cover, then these are related using the formula Avc = Ccv•100%/Con.

	Community Type	A	
		Ccv (Con)	
Code	Species	N = 2	Common Name
	SHRUBS		
SAGL	Salix glauca	2 (50)	grayleaf willow
SAPL2	Salix planifolia	99 (100)	planeleaf willow
	GRAMINOIDS		
AGME3	Agrostis mertensii	T (50)	Arctic bentgrass
JUDR	Juncus drummondii	T (50)	Drummond rush
JUME3	Juncus mertensianus	15 (50)	blackheaded rush
LUPA4	Luzula parviflora	T (50)	millet woodrush
POCU3	Poa cusickii	T (50)	bluegrass
POLE2	Poa leptocoma	T (50)	bog bluegrass
TRSP2	Trisetum spicatum	T (50)	spike trisetum
TRWO3	Trisetum wolfii	T (50)	Wolf trisetum
	FORBS		
ACLA5	Achillea lanulosa	T (50)	western yarrow
ACROT	Acomastylis rossii ssp. turbinata	3 (50)	alpine avens
ACCO4	Aconitum columbianum	3 (50)	Columbian monkshood
ANNAZ3	Anemonastrum narcissiflorum ssp. zephyrum	15 (50)	narcissus anemone
ARLO6	Arnica longifolia	2 (50)	longleaf arnica
ARSC	Artemisia scopulorum	5 (50)	alpine sagebrush
BIBI5	Bistorta bistortoides	T (50)	American bistort
BIVI2	Bistorta vivipara	T (50)	viviparous bistort
CACO6	Cardamine cordifolia	4 (50)	heartleaf bittercress
CAOC4	Castilleja occidentalis	3 (50)	paintbrush
CARH4	Castilleja rhexifolia	4 (50)	splitleaf paintbrush
DRAL4	Draba albertina	T (50)	hairy whitlow-wort
EPSA	Epilobium saximontanum	2 (50)	Rocky Mountain willow-herb
ERSI3	Erigeron simplex	5 (50)	one-stemmed fleabane
ERSU2	Erigeron subtrinervis	T (50)	threenerve fleabane
LIBIH	Ligularia bigelovii var. hallii	3 (50)	Bigelow groundsel
LLSE	Lloydia serotina	T (50)	alp lily
MECI3	Mertensia ciliata	2 (100)	mountain bluebells
MIOD2	Micranthes odontoloma	5 (50)	brook saxifrage
MIRH	Micranthes rhomboidea	T (50)	diamond-leaf saxifrage
OSDE	Osmorhiza depauperata	T (50)	sweet cicely
PEGR2	Pedicularis groenlandica	T (50)	elephantella
POEA	Podistera eastwoodiae	T (50)	Eastwood's podistera
PODI2	Potentilla diversifolia	2 (50)	varileaf cinquefoil
PRPA	Primula parryi	2 (50)	Parry's primrose
PSLE	Psychrophila leptosepala	4 (100)	elkslip marsh-marigold
RHIN11	Rhodiola integrifolia	T (50)	king's crown
SETR	Senecio triangularis	4 (50)	arrowleaf groundsel
SIPR	Sibbaldia procumbens	3 (50)	creeping sibbaldia
STLO2	Stellaria longipes	T (50)	long-stalked stitchwort
STUM	Stellaria umbellata	2 (50)	umbellate starwort
SWPE	Swertia perennis	2 (50)	star gentian
TRPA5	Trifolium parryi	5 (50)	Parry clover
VACAA	Valeriana capitata ssp. acutiloba	2 (50)	sharpleaf valerian
VENU2	Veronica nutans	T (50)	American alpine speedwell
	GROUND COVER		
.BARESO	bare soil	5 (50)	
.LITTER	litter and duff	96 (100)	
GRAVEL	gravel 0.2-10 cm	–	
.COBBLE	cobble 10-25 cm	– –	
.STONES	stone > 25 cm	– –	
.MOSSON	moss on soil	– –	
LICHENS	lichens on soil	10	